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Review article

Adult attachment measures: A 25-year review

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Abstract

Objective: Over the past 25 years, attachment research has extended beyond infant–parent bonds to examine dyadic relationships in children, adolescents, and adults. Attachment has been shown to influence a wide array of biopsychosocial phenomena, including social functioning, coping, stress response, psychological well-being, health behavior, and morbidity, and has thus emerged as an important focus of psychosomatic research. This article reviews the measurement of adult attachment, highlighting instruments of relevance to—or with potential use in—psychosomatic research. **Methods:** Following a literature search of articles that were related to the scales and measurement methods of attachment in adult populations, 29 instruments were examined with respect to their utility for psychosomatic researchers. **Results:** Validity, reliability, and feasibility were tabulated on 29 instruments. Eleven of the instruments with strong psychometric properties, wide use, or use in psychosomatic research are described. These include the following: Adult Attachment Interview (George, Kaplan, and Main); Adult Attachment Projective (George and West); Adult Attachment Questionnaire (Simpson, Rholes, and Phillips); Adult Attachment Scale (and Revised Adult Attachment Scale) (Collins and Read); Attachment Style Questionnaire (Feeney); Current Relationship Interview (Crowell and Owens); Experiences in Close Relationships (Brennan, Clark, and Shaver) and Revised Experiences in Close Relationships (Fraley, Waller, and Brennan); Parental Bonding Instrument (Parker, Tupling, and Brown); Reciprocal Attachment Questionnaire (West and Sheldon-Keller); Relationship Questionnaire (Bartholomew and Horowitz); and Relationship Scales Questionnaire (Grifiin and Bartholomew). **Conclusion:** In addition to reliability and validity, investigators need to consider relationship focus, attachment constructs, dimensions or categories of interest, and the time required for training, administration, and scoring. Further considerations regarding attachment measurement in the context of psychosomatic research are discussed.

Keywords: Attachment; Adulthood; Relationships; Psychosomatic; Psychometrics; Validity

Introduction

Attachment theory [1–4] is a broad theory of social development that describes the origins of the patterns of close interpersonal relationships. The interaction of environmental (especially parental) and genetic factors in early development leads to individual differences in patterns of attachment behavior. Attachment behaviors are interpersonal actions that are intended to increase an individual's sense of security, particularly in times of stress or need. These interpersonal patterns are quite stable and, in adulthood, are known as adult attachment styles. It is beyond the scope of this article to describe the developmental origins of attachment security and insecurity or to explore the psychological construct in depth [1,5,6].

Adult attachment is becoming increasingly important in psychosomatic research because attachment influences many biopsychosocial phenomena, including social functioning, coping, stress response, psychological well-being, health behavior, and morbidity [7–14]. Research that incorporates measurement of attachment provides a unique perspective because attachment constructs are theoretically and empirically distinct from other personality and social constructs

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such as neuroticism, global distress, self-esteem, defensiveness, dysfunctional beliefs, and support seeking [5]. The purpose of this review is to describe and evaluate methods of measuring adult attachment style.

Measurement of attachment: Ainsworth et al.'s strange situation paradigm

Although there are many approaches to measuring and classifying attachment styles, all instruments differentiate patterns of secure attachment and subtypes of insecure attachment. The first instrument to measure patterns of infant–parent attachment was Ainsworth et al.'s strange situation paradigm [1]. This procedure assesses an infant's attachment–exploration balance, or the degree to which the infant uses the caregiver as a "secure" base from which to engage the environment [1]. The prototypical secure infant is distressed by separation from the caregiver, signals this distress directly upon the caregiver's return, and immediately calms with contact. The ambivalent/resistant infant also shows distress on separation, but signals for and resists contact upon the caregiver's return. The avoidant infant may or may not manifest behavioral signs of distress upon separation from the caregiver, although physiological indices suggest high reactivity [15,16]. The infant essentially ignores the caregiver on re-union and shows little outward indication of distress. Ainsworth et al.'s recognition and coding of these patterns influenced the development of many measurement instruments for infants, children, and, more recently, adults.

George et al.'s Adult Attachment Interview

Measurement of adult attachment began with the Adult Attachment Interview (AAI) [17,18]. It was originally developed to predict the attachment pattern of infants to caregivers and was subsequently applied to numerous other research questions. The coding scheme focuses on predictive clues in the interview narrative such as *narrative coherence* in secure adults and *idealization of caregiver* in avoidant/dismissing adults. The AAI yields three categories that are similar to infant attachment categories: (a) secure/autonomous, (b) avoidant/dismissing, and (c) anxious/preoccupied (the adult version of ambivalent/resistant), and a fourth "unclassifiable" category. Where applicable, individuals can also be "unresolved" with respect to loss, trauma, or abuse.

Patterns of relating

Hazan and Shaver considered how adults with different attachment histories would classify themselves according to the ways they think, feel, and behave in close relationships. They argued that the three attachment patterns seen during infancy would emerge as three primary interpersonal styles during adolescence and adulthood. Their original approach presented adults with three patterns of attitudes towards romantic relationships and asked subjects to classify themselves based on perceived similarity to the description [19]. A large US national comorbidity survey that used this technique found prevalence rates as follows: 59%, secure; 25.2%, avoidant; 11.3%, anxious; 4.5%, unclassifiable [20]. A higher prevalence of insecure attachment is generally found in clinical populations, and findings are dependent on the instruments used. Following Hazan and Shaver, more sophisticated self-classification methods and extensive questionnaire-based scales have evolved. A great deal of research has demonstrated the utility of these self-report measures in testing and confirming fundamental predictions about attachment theory. However, there are distinctions between instruments that merit careful consideration before an assessment method is chosen.

Consideration I: self-report evaluation versus coding of observed data

Self-report measures probe conscious attitudes towards relationships and memories of experiences in current relationships; therefore, they cannot detect when defenses distort responses. Self-report questionnaires are also criticized for being passive (i.e., that they do not detect those attachment phenomena that need to be *activated* to be manifested). Self-report instruments most often focus on views that individuals *currently* hold about themselves and others in close relationships. This distinction is relevant to psychosomatic research, where the focus of interest is usually on the contemporary state of the individual in terms of health behavior, course of illness, and impact on future health. Some investigators use *interviews* about contemporary relationships to reduce response bias and to increase attachment activation while focusing on current relationships [21,22]. Others have used projective tests in the form of line drawings depicting various attachment situations [23] to increase the activation of thoughts and feelings linked to attachment experiences.

Although all attachment measures probe emotional regulation, interpersonal awareness, and behavioral strategies in close relationships, they have been employed by two distinct professional silos: social psychologists, who have developed and used self-report measures, and psychodynamic and developmental psychologists, who have preferred tests that do not rely on conscious self-evaluation [5,24]. Different methods of assessing attachment style emphasize different attachment phenomena [25]. The AAI and other interview methods may be used to assess narrative coherence as a marker of secure attachment [17] or to assess a person's ability to reflect on his/her inner world and the perceived intentions or subjective experiences of others [26]. Projective tests may be used to assess a person's capacity to maintain self–other boundaries and to demonstrate self-agency in resolving attachment dilemmas [23]. Self-report measures directly assess conscious attitudes towards, or awareness of behaviors in, experiences of separation, loss, intimacy, dependence, and trust [24].

Consideration II: categorical versus dimensional measurement

Measures of attachment either assign individuals to *categories* of attachment style or measure the degree to which various *dimensions* of attachment style are present. Dimensional models of adult attachment converge on two dimensions of insecurity: attachment anxiety (negative sense of self) and attachment avoidance (negative sense of others). Attachment anxiety is characterized by an expectation of separation, abandonment, or insufficient love; a preoccupation with the availability and responsiveness of others; and hyperactivation of attachment behavior. Attachment avoidance is characterized by devaluation of the importance of close relationships, avoidance of intimacy and dependence, self-reliance, and relative deactivation of attachment behavior. If standard and acceptable cutoff points are defined, categories can be derived from dimensional scales. Categorical measures of attachment are criticized theoretically, for assuming that differences among people within a category are "unimportant or do not exist" (Mikulincer and Shaver [24], p. 85), and analytically, for their limited statistical power compared with dimensional measures [27]. However, for clinical use, the categorical approach of recognizing phenomena according to their similarity to prototypic "textbook cases" is often preferred [25]. Moreover, there is no consensus as to whether attachment phenomena are inherently categorical or dimensional. Analytically, when a categorical construct is measured using a dimensional scale, part of the observed variance is spurious.

Bartholomew and Horowitz's four-category model helpfully reconciles categorical and dimensional models by defining categories that correspond to combinations of extreme positions on the dimensions of attachment anxiety and attachment avoidance. Thus, secure attachment is conceptualized as a relative absence of attachment anxiety and attachment avoidance; preoccupied attachment is conceptualized as high attachment anxiety and low attachment avoidance; dismissing attachment is conceptualized as high attachment avoidance and low attachment anxiety; and fearful attachment is the combination of high insecurity on both dimensions of attachment avoidance and attachment anxiety.

Consideration III: state versus trait

Attachment phenomena have been described as "state-dependent traits." This description refers to the fact that attachment *behaviors* are not always on display but are activated by specific events such as situations of danger, threat, or isolation. On the other hand, there is a trait-like consistency to the *patterns* of behavior that are triggered in such situations. Furthermore, attitudes towards relationships (e.g., expectations of others' trustworthiness or one's own lovability) guide attachment behavior and have a trait-like consistency. Attachment measures may vary in their sensitivity to the activation or inactivation of attachment phenomena; thus, some measures may be more sensitive to state-dependent changes.

Consideration IV: differing relational foci

While developmental attachment experiences do give rise to stable conscious attitudes and preferences in adulthood, it is also true that some observations of adult attachment style are specific for the circumstances of a particular type of relationship or for a particular dyad. Thus, measures of (a) an adult's memories of attachment to his/her parents, (b) an adult's attitudes and experiences in a current romantic relationship, (c) general attitudes towards adult romantic relationships, and (d) an adult's parenting attitudes and behaviors towards one's children are not interchangeable. Furthermore, since patterns of attachment are fundamentally oriented towards dyadic interactions, patterns of attachment may differ for the same individual in different relationships (e.g., secure with respect to mother, but insecure with respect to father; or varying from one romantic relationship to the next). Therefore, the researcher will need to decide which dyad is most important to examine for their particular research question.

Consideration V: differing nomenclature for similar or overlapping constructs

The nomenclature used in the measurement of adult attachment is complicated. Starting with the AAI, adults are assigned to four categories: "free and autonomous with respect to attachment" (a.k.a. secure), "enmeshed and preoccupied with attachment" (a.k.a. anxious), "dismissing of attachment" (a.k.a. avoidant), and "cannot classify" or "unresolved with respect to trauma" (a.k.a. disorganized). The earliest categorical self-report instrument assigned people to three categories (secure, preoccupied, and avoidant), but Bartholomew and Horowitz's [21] subsequent four-category scheme has secure, preoccupied, avoidant/dismissing, and avoidant/fearful categories. Dimensions of "attachment avoidance" and "attachment anxiety" are measured by many of the instruments described in this review. It is important to appreciate, as described above in Consideration II: Categorical Versus Dimensional Measurement, how these differently named attachment categories or dimensions overlap and differ.

Consideration VI: relevance to psychosomatic research

None of the measures of adult attachment in current use was developed for psychosomatic research. Despite good evidence to support the theoretically derived links between the quality of patient–provider relationship, health care utilization, and other medical outcomes [9,11,12,14,15,28–32], it may be off-putting for patients with serious medical conditions to report on attitudes towards romantic relation-

Table 1
Adult attachment instruments

Scale [a]	Authors	Number of items	Subject time [b]	Scoring time [b]	Relationship focus	Yields categories/ dimensions	Categories/dimensions measured	Reliability [c]	Validity [d]	Further psychometric support
Interviewer-assessed instruments										
Adult Attachment Interview (AAI)	George et al. [17], Fonagy et al. [26,44,45], Kobak [42], Fyffe and Waters [43], Grossmann et al. [46]	20	L	VL	Parents	C	Secure/autonomous, dismissing, preoccupied, unresolved/disorganized with respect to trauma	+++	+++	[11,18,33–42, 47,50,87,98–108]
Adult Attachment Interview as a Questionnaire (AAIQ)	Crandell et al. [109]	20	L	L	Parents	C	Secure/autonomous, dismissing, preoccupied, unresolved/disorganized with respect to trauma	++	++	[110]
Adult Attachment Projective (AAP)	George and West [23] and Buchheim et al. [52]	8	L	L	Nonspecific	C	Secure, dismissing, preoccupied, unresolved	+	++	[53,54,111–113]
Attachment Style Interview (ASI)	Bifulco et al. [114]	NK	VL	VL	Close relationships	C	Secure, enmeshed, fearful, angry/ dismissive, withdrawn	+	++	[115,116]
Couple Attachment Interview (CAI)	Cohn and Silver [101]	29	VL	VL	Partner	C	Secure, dismissing, preoccupied	++	++	[117,118]
Current Relationship Interview (CRI)	Crowell and Owens [47]	22	VL	VL	Couples	C	Secure, insecure/dismissing, insecure/preoccupied	++	+++	[48–51,118–121]
Marital Attachment Interview (MAI)	Dickstein et al. [122]	16	L	VL	Spouse	C	Secure, dismissing, preoccupied, unresolved with respect to loss or trauma, cannot classify	+	+	[121,123]
Secure Base Scoring System (SSBS)	Crowell et al. [49]	8	VL	VL	Couples	D	Secure base use, secure base support	++	+	[48]
Self-report questionnaires										
Adult Attachment Styles	Hazan and Shaver [19]	1	VS	VS	Intimate relationships	C	Secure, avoidant, anxious/ambivalent	++	+	[59,60,87,90, 124–130]
Adult Attachment Questionnaire (AAQ)	Simpson [58] Simpson et al. [61]	17 13	S	VS	Partner	D	Attachment anxiety, attachment avoidance	++	+++	[62–64,87,131]
Avoidant Attachment Questionnaire for Adults (AAQA)	West and Sheldon-Kellor [82]	22	S	VS	General	D	Maintains distance in relationships, priority on self-sufficiency, attachment relationship is a threat to security, desire for close affectional bonds	+	+	[59]
Adult Attachment Scale (AAS) and Revised-Adult Attachment Scale (RAAS)	Collins and Read [56] Collins [57]	21 18	S	VS	Partner	D	Comfort with closeness, comfort with depending on others, anxious concern about abandonment	++	+++	[31,55,59,60, 87,91,131]
Attachment History Questionnaire (AHQ)	Pottharst [132]	51	L	VS	Partner	C and D	Categories: secure, insecure; dimensions: secure attachment, parental discipline, peer system	+	++	[133,134]
Attachment and Object Relations Inventory (AORI)	Buelow et al. [135]	75	L	VS	Parents, peers, partners, and self	D	View of self as: warm, secure, interdependent, not anxious versus distant, dependent/preoccupied, anxious; view of others as: emotionally accessible, responsive versus not accessible, unresponsive	+++	++	[136]
Attachment Style Questionnaire (ASQ)	Feeney et al. [73]	40	S	VS	Close relationships	D	Discomfort with closeness, need for approval, preoccupation with relations, viewing relationships as secondary to achievement, lack of confidence	++	++	[12,32,55,59,74, 75,131,137]

Continued Attachment Scale (CAS)	Berman et al. [138]	12	VS	VS	Parents	D	Cognitive and behavioral components of parental attachment	+	++	[139,140]
Client Attachment to Therapist Scale (CATS)	Mallinckrodtet et al. [141]	36	S	VS	Therapist	C	Secure, avoidant/fearful, preoccupied/merger	++	+	[56,142]
Experiences in Close Relationships (ECR) and Experiences in Close Relationships-Revised (ECR-R)	Brennan et al. [59] Fraley and Shaver [27]	36 36	S	VS	Partner (or general)	D	Attachment anxiety, attachment avoidance	++	+++	[5,8,9,14,24, 60,76–79,130, 143,144]
Measure of Attachment Qualities (MAQ)	Carver [145]	14	VS	VS	General	C	Security, avoidance, ambivalence/worry, ambivalence/merger	++	+	[146]
Mother Father Peer Scale (MFPS)	Epstein [147]	70	L	VS	Parents and peers	D	Acceptance/rejection, independence/overprotection, defensive idealization	+	++	[148]
Maternal Separation Anxiety Scale (MSAS)	Hock et al. [149]	35	S	VS	Child	D	Maternal separation anxiety, perception of separation effects on child, employment-related separation concerns	++	++	[148]
Parental Attachment Questionnaire (PAQ)	Kenny [150]	55	L	VS	Parents (of adolescents)	D	Affective quality of relationships, fostering of autonomy, provision of emotional support	++	++	[151,152]
Parents of Adolescents Separation Anxiety Scale (PASAS)	Hock et al. [153]	35	S	VS	Adolescent children	D	Anxiety about adolescent distancing, comfort with secure base role	+	++	[154,155]
Parenting Bonding Instrument (PBI)	Parker et al. [84,85]	50	L	VS	Parents	D	Parental care, parental protection	++	+++	[86,156]
Reciprocal Attachment Questionnaire for Adults (RAQA)	West et al. [80], West and Sheldon [81], and West and Sheldon-Kellor [82,83]	15	S	VS	Most important attachment figure	D	Proximity seeking, separation protest, feared loss, perceived availability, angry withdrawal; compulsive: care giving, self-reliance, and care seeking	++	++	[157]
Reciprocal Questionnaire (RQ)	Bartholomew and Horowitz [21]	4	VS	VS	Partner	C and D	Secure, preoccupied, dismissing, fearful	+	++	[10,12,55,66,68–70,73,74,76,94, 127,131,158]
Relationship Scales Questionnaire (RSQ)	Griffin and Bartholomew [71]	30	S	VS	Partner	C and D	Categories: secure, preoccupied, fearful, dismissing; dimensions: model of self and model of others	+	++	[34,66,67,69, 131,159]
Revised Inventory of Parental Attachment (R-IPA)	Johnson et al. [160]	30	S	VS	Children	D	Trust/avoidance, symptom distress, social role, interpersonal relations, physical aggression	+	+	[161]
Vulnerable Attachment Style Questionnaire (VASQ)	Bifulco et al. [22]	23	S	VS	Support	D	Insecurity, proximity seeking	++	++	–

[a] For each scale, the original source is cited along with revised versions and alternate coding, where applicable.
[b] Subject and scoring time are categorized according to the following labels: VS (very short), <5 min; S (short), 5–15 min; L (long), 15–60 min; VL (very long), >1 h; NK (not known).
[c] Reliability scores: (+ to ++) adequate test–retest, interrater, or interitem; one "+" for each criterion; (+++) excellent properties.
[d] Validity scores: (+) convergent with other attachment scales; (++) other evidence of convergent, discriminant, and predictive validity; (+++) excellent properties.

ships, which, on the face of it, seem to have little relevance to their most pressing concerns. Thus, the apparent relevance of questions or items in an attachment measurement to the situations of the persons who are being evaluated will be a consideration in choosing an attachment measure.

Methods

Literature review

We utilized two complementary search strategies. In the "bottom-up" strategy, we identified all publications on attachment and reviewed method sections to compile a list of common attachment instruments. In the "top-down" strategy, we used published reviews of attachment measures to identify seminal psychometric reports and then searched for articles that cited these reports.

Bottom-up strategy

We searched the Web of Science (Thomson Reuters) for English-language articles using the keywords "attachment," "avoidant," "dismiss*," "fearful," "ambivalent," "preoccupied," or "autonomous" from 1968 to 2008, which yielded >100,000 citations, most which were excluded because of irrelevant meanings of "attachment."

We narrowed the search by selecting articles that were related to scales, measurement methods, and adult populations. All abstracts were reviewed with the aid of several computer-based filter programs to compile a comprehensive list of instruments used in these articles. We excluded position or theoretical papers that did not report on the use of scales, and papers reporting on scales for which we could find no report of use in at least one other study. We thus found 25 distinct instruments.

Top-down strategy

The bottom-up strategy may miss articles in which attachment instruments were not mentioned in titles, abstracts, or keywords. This was addressed by identifying papers that reported on the instrument development, reliability, or validity studies of 25 attachment scales identified in the bottom-up strategy or cited by an authoritative source [5,6]. Subsequent papers citing these instrument development papers were then searched for. This strategy identified an additional four instruments.

A total of 29 instruments were examined with respect to their utility to psychosomatic researchers. Instruments are described in terms of the major distinctions and considerations mentioned in the Introduction. Reported validity, reliability, and feasibility are tabulated and scored. With respect to reliability, one "+" was assigned to each of the adequate test–retest, interrater, and interitem indices (0 to +++). With respect to validity, one "+" was assigned to evidence for each of the following: convergence with other attachment instruments, evidence of discriminant validity, and evidence of predictive validity (0 to +++). Specific reliability and validity data are reported on a subset of instruments in the body of the paper. Subject and scoring times (including transcription) are tabulated for each instrument in the table.

Results

The characteristics of 29 adult attachment instruments are summarized in Table 1. The original papers which describe the instruments are cited in the table in addition to subsequent studies which provide further psychometric support. We describe and review 11 instruments based on: (a) their strong psychometric properties, (b) wide use, or (c) potential utility for psychosomatic research. Usage was determined with citation searches. Additionally, we reviewed psychosomatic studies in which adult attachment patterns or dimensions were measured to ensure inclusion of the scales that have been frequently used in psychosomatic research.

Interview and projective measures

The Adult Attachment Interview

The AAI explores an adult's mental representations of attachment while discussing childhood experiences. Transcribed descriptions of childhood experiences with each parent are coded. The "parental behavior" scales used are as follows: loving, rejecting, neglecting, involving, or pressuring. "State of mind" scales are also scored, particularly with respect to the coherence of discourse: idealization, insistence on lack of recall, active anger, derogation of parents or of attachment, fear of loss, meta-cognitive monitoring, and passivity of speech. Overall coherence of the transcript is also coded. Subjects are classified as secure/autonomous, dismissing, preoccupied, or "cannot classify," along with, where applicable, "unresolved" with respect to loss, trauma, or abuse. Learning the interview and its scoring requires 2 weeks of specialized training, in addition to passing a reliability check in which agreement is established across 30 transcripts [18].

Rigorous psychometric testing and meta-analyses of the AAI demonstrate stability and discriminant and predictive validity in both clinical and nonclinical populations [18,33–35]. The test–retest stabilities of the secure/autonomous, dismissing, and preoccupied categories are 77–90% across 1- to 15-month periods [33,36,37] and are not attributable to interviewer effects. In a recent meta-analysis of 61 clinical samples, strong associations were found between psychiatric diagnoses and attachment insecurity [35]. Studies of adult attachment representations have demonstrated significant associations between insecurity and clinical status in patients with anxiety disorders, borderline personality, and violence [33,35,38–41]. Patients with borderline personality disorder or histories of abuse or suicidality often have unresolved/disorganized and unclassifiable transcripts [35].

Alternate scoring systems of AAI transcripts have been reported. The three-category (secure, dismissing, and preoccupied) Adult Attachment Interview Q-Sort method codes deactivating versus hyperactivating affect regulation strategies (interrater reliability κ=.65) [42]. The Q-Sort method involves a systematic sorting of interview elements into categories along a single continuum, which are scored on dimensions of security/insecurity and deactivation/hyperactivation. Classification by Q-sort and original AAI scoring result in the same classification in 80% of cases. Fyffe and Waters coded the AAI on continuous dimensions and distinguished security from insecurity with 89% accuracy. They distinguished dismissing from preoccupied with 96% accuracy, compared to the original AAI scoring [43]. Fonagy et al. [26,44] scored "reflective functioning" (a person's capacity to understand one's own and others' mental states, intentions, and motives) from AAI transcripts. These scores correlate with "coherence of mind" scores and are a robust predictor of the interviewee's infant's security [45]. Grossmann et al. [46] created a two-category coding system with some demonstrated associations between attachment security in mothers and maternal sensitivity to their infants.

The Current Relationship Interview

The Current Relationship Interview (CRI) [47] is an interview procedure that is most frequently used for assessing adult attachment in couple relationships. Interviewees are asked to describe their couple relationship and to provide examples of using their partner as a secure base and of providing a secure base for the partner. Scoring is also done from a transcript. Ratings are based on the described behavior and thinking about attachment-related issues (valuing intimacy and independence), their partner's behavior, and their discourse style (anger, derogation, idealization, passivity of speech, fear of loss, and overall coherence). Security is assessed according to coherent reports of being able to use a partner as a secure base and of providing a secure base, *or* the coherently expressed desire to do so. Those who are not coherent are divided into those who avoid or dismiss the significance of the relationship and those who appear preoccupied and intent on controlling it. The CRI has good temporal stability over 18 months [48] and is unrelated to intelligence, education, gender, duration of relationship, or self-reported depression [49,50]. Distribution of classifications can vary with developmental stage. For example, 46% of young engaged adults were classified as secure on the CRI, in contrast to 71% of married individuals with children [51]. Correspondence between the AAI and the CRI ranges from 55% to 71% [50]. The CRI has predicted self-reports of relationship quality, violence, divorce, and satisfaction [50].

The Adult Attachment Projective

In the Adult Attachment Projective (AAP) [23,52], eight drawings of attachment situations dealing with illness, solitude, separation, loss, and abuse, along with one neutral scene, are presented to the interviewee as a way of activating his/her attachment system. A narrative depiction of these drawings is transcribed and coded. The scoring evaluates qualities of discourse, content, and defensive processing, and designates subjects as secure, dismissing, preoccupied, or unresolved. The convergence between AAP and AAI ratings is reported to be 94% [23], and interrater reliability is high (κ=.86). Administration time is approximately 30 min plus 1 h for verbatim transcription, and an hour for analysis. Training requires a 2-week seminar, after which raters are required to classify 25 interviews to 80% reliability. The AAP has been used in studies in which participants provided narratives while simultaneously having brain functional MRI [53,54]. Buchheim et al. presented evidence of the potential neural mechanisms of attachment trauma in patients with borderline personality disorder. Compared with controls, female patients with borderline personality disorder showed greater anterior midcingulate cortex activation in response to images of characters facing attachment threats alone, and greater right superior temporal sulcus activation along with lessened right parahippocampal gyrus activation in response to images of dyadic interactions in an attachment context [53,54].

Self-report measures of attachment in romantic and other relationships

Self-report measures can be divided into those that derive attachment categories and those that derive attachment dimensions. Categorical measures of attachment in romantic relationships have evolved since Hazan and Shaver's [19] forced-choice Adult Attachment Styles self-report. Nonetheless, this measure's brevity, ease of administration, and face validity have led to its wide use [55] in spite of the subsequent development of more nuanced instruments.

Adult Attachment Scale and Revised Adult Attachment Scale

Two groups have decomposed Hazan and Shaver's prototypical attachment descriptors into component statements (with additions): the Adult Attachment Scale (AAS) [and its revised version, the Revised Adult Attachment Scale (RAAS)] [56,57] and the Adult Attachment Questionnaire (AAQ) [58]. The AAS and the RAAS yield three subscales: comfort with emotional closeness, comfort with depending on or trusting in others, and anxious concern about being abandoned or unloved. Participants are asked to respond in terms of their general orientation towards close relationships. Brennan et al. [59] found that the first two factors correlate with an avoidance dimension (r=.86 and r=.79, respectively) and that the latter correlates with an anxiety dimension of other self-report attachment scales (r=.74). The AAS has shown a test–retest reliability of 70% over 4 years [60]. Internal consistency reliability, α coefficient, and retest reliability after a 2-month interval were >.58 for the three subscales. Subscale scores were correlated in expected directions with measures of self-esteem, social behavior, instrumentality, expressiveness, openness, and satisfaction in romantic relationships [56,57].

AAS insecurity has been linked to personality factors, depressive and anxiety symptoms, negative affectivity, and proneness to distress [55].

The Adult Attachment Questionnaire

The AAQ [58,61] yields continuous measures of three attachment styles in romantic relationships: secure (Cronbach's α=.51), avoidant (Cronbach's α=.79), and anxious (Cronbach's α=.59). Factor analyses suggest that their items represent two dimensions: a *secure/avoidant* dimension and an *anxious/nonanxious* dimension. Simpson commented that the secure and anxious indexes were less reliable, and that comparisons of effect sizes between the three attachment indexes should be done cautiously. Significant associations between attachment, support giving, and support seeking have been found in women with romantic partners using the AAI and the AAQ [62]. Attachment dimensions on the AAQ and depression were found to be significantly associated in nonclinical samples [63,64].

Relationship Questionnaire

Bartholomew and Horowitz's *four-category two-dimensional* model [21] has been measured with their Relationship Questionnaire (RQ) [21], a forced-choice instrument in which the four styles of attachment are described in brief paragraphs. The respondents rate the degree to which they resemble each style on a 7-point scale. Although the secure prototype is similar to Hazan and Shaver's, the dismissing prototype describes comfort without close relationships and the importance of feeling independent and self-sufficient. The preoccupied prototype describes a person wishing to be "completely emotionally intimate with others" but, finding that this is not reciprocated, worries that others do not value him/her as much as he/she values others. Finally, the fearful prototype describes a person wishing for, but being uncomfortable with, closeness and finding it difficult to trust or depend on others, with worry that he/she will be hurt if others are allowed to become too close. Dimensions related to one's model of self (dependence) and model of others (avoidance) can also be generated from this instrument; however, its primary aim was to classify into one of four prototypes. They compared ratings on the RQ with ratings on the Inventory of Interpersonal Problems [21,65] and found that the dismissing group had "a lack of warmth" in social interactions; the preoccupied were overly expressive, warm, and somewhat intrusive; and the fearful group had poor agency, social insecurity, passivity, and lack of assertiveness. Cronbach's α values for different scales ranged from low for security (.32) to high for fearful (.79) [66,67]. Stability and fluctuation were tested along with covariation between attachment security, coping, and well-being over a 6-year period in 370 individuals. Fluctuation in security negatively covaried with defensive coping and depressive symptoms, and positively covaried with integrative coping and self-perceived well-being. Over time, older participants became more secure, more dismissing, and less preoccupied [68]. There was a strong negative correlation between model of self and neuroticism, and a positive correlation between model of others and extraversion [69]. Significant associations between adult attachment and depression and anxiety symptoms, negative affectivity, and health care provider relationships have also been found using the RQ [10,55,70].

Relationship Styles Questionnaire

Whereas the primary aim of the RQ is to classify into groups, the 30-item Relationship Styles Questionnaire (RSQ) [71] uses the same conceptual framework to measure dimensions related to positive or negative models of self and others. Items derived from Hazan and Shaver's three-category attachment prototype descriptors, Bartholomew and Horowitz's four-category attachment prototype descriptors, and Collins and Read's attachment measure are scored on a 5-point scale to yield four attachment patterns and two attachment dimensions. Scales include secure, avoidance, ambivalence, closeness, anxiety, and dependency. Although the secure scale α was .50, all other scale α values ranged from .69 to .82. Confirmatory factor analyses [34] suggest that the dimensions of avoidance (α=.86) and anxiety (α=.84) are the best-fitting model. With respect to measurement of attachment categories, Backstrom and Holmes [66] found low reliabilities of the secure (α=.32) and preoccupied (α=.46) patterns. Griffin and Bartholomew found fearful (.79) and dismissing (.64) to have higher Cronbach's α values. The reliability of "model of others" was found to be acceptable (α=−.68); however, that of "model of self" was low (α=.50). High levels of attachment anxiety and avoidance on the RSQ predicted psychopathology under conditions of high and low life stress, whereas the AAI only did so under conditions of high stress [67]. Correlations between the RQ and the RSQ are high, and both instruments are correlated to NEO Personality Inventory personality factors, but are not identical to them [71]. Ciechanowski et al. used the RQ and the RSQ in a study of attachment, primary health care utilization, and costs. Patients with preoccupied and fearful attachment reported significantly greater physical symptoms compared with secure patients. However, those with preoccupied attachment had the highest care costs and utilization, whereas those with fearful attachment had the lowest care costs and utilization [72].

The Attachment Style Questionnaire

The Attachment Style Questionnaire's (ASQ) [73] 40 items are rated on a 6-point scale. Five subscales are identified: discomfort with closeness, need for approval, preoccupation with relations, viewing relationships as secondary (to achievement), and lack of confidence. Feeney reported α coefficients for the scales that ranged from .76 to .84 in a large sample of undergraduates, and stability coefficients ranging from .67 to .78 across a 10-week period.

The ASQ has been used in adolescents and adults, examining links with appraisals of social support and coping with stressful events [74], relationship satisfaction [75], and depression and anxiety in nonclinical samples [55]. It has also been used to examine how attachment predicts pain and depression in patients with chronic pain [12,32]. In a large factor-analytic study, Brennan et al. correlated discomfort with closeness (r=.90) and viewing relationships as secondary to avoidance (r=.61). Preoccupation with relationships and a need for approval and confirmation by others were related to anxious attachment. The lack of confidence scale loaded mostly on avoidance (.70) [59].

The Experiences in Close Relationships

The Experiences in Close Relationships (ECR) instrument 59] emerged from a principal components analysis of 323 attachment items from 60 self-report measures of attachment, many of which were unpublished, as completed by 1086 undergraduates. The analysis produced factors related to *attachment anxiety* and *attachment avoidance*. Items were selected to correlate highly with the two overall dimensions of attachment: avoidance (18 items; e.g., "I prefer not to show a partner how I feel deep down") and attachment anxiety (18 items; e.g., "I worry about being abandoned"). The ECR was revised [Revised Experiences in Close Relationships (ECR-R)] to improve the item–response metrics of the scale [76,77], although there has been no significant gain in validity and both scales can be interpreted to be "quite similar in meaning" [24]. α coefficients are reported to be near or above .90, and test–retest coefficients are reported to be between .50 and .75, with little correlation between the two scales of anxiety and avoidance in most samples [24]. They are both widely used to measure romantic attachment (with excellent reliability) and to study the link of attachment with appraisal of social support [78], negative affectivity, and psychiatric symptomatology [55,79]. The ECR-R predicted more than twice as much variance in diary ratings of anxiety and avoidance experienced with a romantic partner (r values roughly .50), in contrast to family members or close friends [76]. The method of instrument development (borrowing items from other scales based on psychometric properties) has resulted in a scale containing some items that are problematic because of redundancy and awkward syntax. The ECR-R has been used in studies of attachment and stress responsivity using salivary cortisol levels and heart rate variability. Ditzen et al. [14] showed that subjects with the combination of social support and secure attachment exhibited the lowest levels of state anxiety following stress exposure. In a study of attachment insecurity and stress reactivity in healthy adults, Maunder et al. [9] found that attachment avoidance was not associated with subjective distress, but was inversely associated with high-frequency heart rate variability. Attachment anxiety, however, was associated with self-reported distress, but not with altered autonomic function.

The Reciprocal Attachment Questionnaire for Adults

The Reciprocal Attachment Questionnaire for Adults (RAQA) [80–83] asks respondents to rate their most important attachment figure according to proximity seeking, separation protest, feared loss, availability, reliance on the attachment figure, angry withdrawal, compulsive care giving, compulsive self-reliance, and compulsive care seeking. Three subscales (feared loss, separation protest, and proximity seeking) distinguish adult attachment relationships from other social relationships, and two subscales (use of attachment figure and perceived availability of the attachment figure) relate to the role of attachment for the individual. Test–retest coefficients of a community sample over 4 months ranged from .76 to .82 [83]. In both clinical and nonclinical populations, coefficient α values ranged from .74 to .85 [82]. Factor analysis confirmed the theoretical distinction between the criteria of adult attachment, and discriminant functions analyses demonstrated high relevance to differentiating psychiatric outpatients from nonpatients [80,82]. Although it was not intended to map onto dimensions of anxiety or avoidance, it has been found to be translatable to these terms of reference. West and Sheldon-Kellor's [83] Avoidant Attachment Questionnaire for Adults is unique in focusing on avoidant attachment (including persons with no romantic partner). Its four subscales measure how individuals maintain distance in relationships, prioritize self-sufficiency, view relationships as a threat to security or a sign of weakness, and desire closer affectional bonds.

The Parental Bonding Instrument

The Parental Bonding Instrument (PBI) (and its modified version, with a scale assessing parental abuse [84,85]) probes adult recollections of parental behaviors and attitudes towards the subject in childhood. It was developed using factor analyses from parents self-reporting experiences in childhood and yielded two factors: care and overprotection. High care and low overprotection are considered optimal, whereas low care and high overprotection ("affectionless control") are considered least optimal; the two scales are inversely correlated. The parental care scale measures the degree to which a mother or a father was empathic and caring or cold and indifferent. The parental overprotection scale measures the extent to which a parent was intrusive and infantilizing or, in contrast, fostered independence in the subject. Discriminant validity between clinical and nonclinical populations has been established with greater affectionless control in clinical participants and in more seriously disturbed patients [86]. Convergent validity of the AAI and the PBI was examined by Manassis et al. [86], who found that attachment information obtained from the PBI and the AAI was comparable in participants with optimal (secure) attachment histories, but not in participants showing idealization or anger towards their mothers. They advise caution in using the PBI in "clinical samples where suboptimal (unresolved) attachment histories are likely."

Convergence between different measurement strategies

Eleven studies have examined associations between self-report adult attachment instruments and the AAI [34,41,50,62,87–93]. Roisman et al.'s [34] meta-analysis of all studies that include both the AAI and a self-report measure of adult attachment found a low correlation of .09. Interview methods and self-report methods assess different facets of attachment and thus do not consistently converge. Attachment dimensions measured in self-reports may reflect a stress–diathesis perspective on attachment dynamics, whereas the AAI scoring reflects unconscious processes and states of mind. Roisman et al. used the AAI and the RSQ in studies of individuals' personality traits and with engaged couples, and concluded that interview versus self-report measurement of attachment predicted "somewhat distinct, theoretically anticipated aspects of functioning in adult relationships" [34]. But this is not the whole story, since there are studies showing that self-report attachment measures are correlated with aspects of unconscious processing [5]. Shaver et al. found that the two AAS avoidance scales (discomfort with closeness and dependence on partners) were predicted from AAI coding scales with r values around .50. "Coherence of mind" (β=0.40) was the most heavily weighted predictor of the AAI. Almost every AAI coding scale could be predicted by the AAS from analyses run in the other direction. This study differs from other studies of convergent validity between the AAI and self-report scales in that it looked at a detailed level rather than simply comparing gross categorical findings. Other reported associations between specific self-report instruments and the AAI are mixed—from no significant associations [62,93] to moderate associations only for either self-reported avoidance [41,87] or self-reported anxiety [88,89], with some gender-specific differences [34]. One explanation for the *mixed findings of convergence*, as discussed above, is that the AAI aims to measure unconscious aspects of attachment-related defenses and behaviors in contrast to the self-report measures of conscious appraisals of feelings and behaviors in close relationships. An explanation for the *mixed findings of moderate associations* offered by Mikulincer and Shaver [24] is that some indices of implicit unconscious processes can be predicted by self-report measures [51].

Discussion

The importance and relevance of attachment to clinical populations in psychosomatic medicine is an exciting research frontier. A partial survey of findings to date demonstrates its relevance to stress response [9,14,15]; relationship with care providers in diabetic patients [10,70]; pain [12,32,94]; chronic diseases, including ulcerative colitis [9]; alopecia, leg ulcers, and breast cancer [13,95]; somatization [11,96]; hypochondriacal concerns [31]; and health care utilization [72]. In psychosomatic research, the most commonly used scales to date are the AAI, the ECR-R, the RQ, the AAS, and the ASQ.

In this review of adult attachment instruments, we have summarized the tensions in this emerging field and tabulated the psychometric properties of instruments that might be used in research. This review is different from other reviews of adult attachment measurement [6,24,34,87,97,98] in its 25-year scope, with a focus on psychosomatic research and the tabulation of the descriptive characteristics and psychometric properties of the instruments. In addition to reliability and validity, investigators need to consider which relationship is the focus (romantic partner, parents, children, etc.); what kinds of attachment constructs, dimensions, or categories are of interest with respect to the research question; and the time required for training, administration, and scoring. In studies in which attachment is the primary area of investigation, the AAI remains the most established instrument, with excellent psychometric properties. However, it requires significant resources, time, and training for administration, transcription, and coding, thus limiting the feasibility of use in many settings. Differing coding methods can be more time-efficient [26]. The AAP has good reliability and validity, and requires half the time to administer and code compared to the AAI. When attachment is a secondary area of investigation, a forced-choice, very short questionnaire such as the RQ has adequate reliability and very good face and discriminant validity. Dimensional self-report attachment instruments may be appropriate when attachment is a primary focus but interview or observational measures are not feasible, or when conscious attitudes and behaviors in current relationships are relevant to the research question.

With respect to the consideration of classification of attachment into categories versus dimensions, it is our belief that categories can be helpful in clinical settings. They aid clinicians in tailoring interventions based on an understanding of individuals' differences. In medicine, categorization allows for rapid diagnosis and clinical decision making. However, dimensions of attachment detect more subtle differences between individuals and, therefore, can be of greater utility in research.

A limitation of this review is that we may have missed new studies in this rapidly expanding area of research that provide further psychometric data or newer scales. As well, it is possible that scales developed for adolescents, not included in this review, may be useful with adults. Despite progress in adult attachment instrument development, there remains room for growth and innovation in this field, especially as there is no scale yet designed specifically to address core constructs in psychosomatics, such as the degree of attachment to a health care provider. Psychosomatic research will benefit from a wider adoption of instruments that measure adult attachment, providing a unique perspective on the contribution of social relationships to health and illness.

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